

Abstract of the Disclosure

EFFICIENT HEAT EXCHANGER AND ENGINE USING SAME

Some engine applications place spatial constraints on heat exchangers, such as oil coolers. In such a case, a heat exchanger having an oblong rather than a circular cross section can satisfy spatial constraints, and with certain internal geometry, may permit improved heat rejection performance while potentially enabling a cost reduction through a reduction in materials. The heat exchanger has a housing which defines a heat exchanging cavity within which a tube bundle is positioned. The tube bundle is made up of a plurality of tubes in a hexagonal packing pattern that are supported by a plurality of baffles. The tube bundle and the housing define a serpentine flow path between an inlet and an outlet. The serpentine flow path includes a plurality of segments that are generally perpendicular to the tubes, and these segments are separated by flow direction changing windows. The tube bundle has a gap distance at the windows that is relatively large, and a gap distance away from the windows that is relatively small. In addition, each of the tubes of the tube bundle is adjacent to at least three other tubes, such that the perimeter set of tubes creates a hexagonal shape.